In contrast, the present Collection Information Manager invention has none of these limitations, as the following disclosure will show.

SUMMARY OF THE INVENTION

Collection information managers improve the productivity of knowledge workers in the information industry by organizing information about arbitrary collections of computer files into collection data structures, for use by automated collection processing programs.

Collection information is

A collection data structure is comprised of three major types of related information: (a) a collection specifier that contains organized information about one collection instance, including a collection type indicator that links to a collection type definition; (b) a collection type definition that defines detailed information about characteristics shared by all collections of a particular collection type, and (c) zero or more collection content files that comprise the information content of a collection.

In operation, collection information managers analyze collections of computer files to produce information-rich collection data structures for use by application programs. Application programs subsequently use the collection data structures to understand and process collections in practical, useful ways.

As a consequence of using collection data structures, automated programs can perform more complex software processes than were previously possible, thereby improving the productivity of human knowledge workers. It follows that as manual human processes are replaced by automated collection processing systems, corresponding amounts of human effort will be freed for other purposes.

116 Collection specifier server means

117 Collection content server means

DETAILED DESCRIPTION

Overview of Collections

This section introduces collections and some related terminology.

Collections are sets of computer files that can be manipulated as a set, rather than as individual files. COLLECTION INFORMATION IS Collection are comprised of three major parts: (1) a collection specifier that contains information about a collection instance, (2) a collection type definition that contains information about how to process all collections of a particular type, and (3) optional collection content in the form of arbitrary computer files that belong to a collection.

Collection specifiers contain information about a collection instance. For example, collection specifiers may define such things as the collection type, a text summary description of the collection, collection content members, derivable output products, collection processing information such as process parallelism limits, special collection processing steps, and program option overrides for programs that manipulate collections. Collection specifiers are typically implemented as simple key-value pairs in text files or database tables.

Collection type definitions are user-defined sets of attributes that can be shared among multiple collections. In practice, collection specifiers contain collection type indicators that reference detailed collection type definitions that are externally stored and shared among all collections of a particular type. Collection type definitions typically define such things as collection types, product types, file types, action types, administrative policy preferences, and other information that is useful to application programs for understanding and processing collections.

Collection content is the set of all files and directories that are members of the collection. By convention, all files and directories recursively located within an identified set of subtrees are usually considered to be collection members. In addition, collection specifiers can contain collection content directives that add further files to the collection membership. Collection content is also called collection membership.

Collection is a term that refers to the union of a collection specifier and a set of collection content.

Collection information is a term that refers to the union of collection specifier information, collection type definition information, and collection content information.

Collection membership information describes collection content.

Collection information managers are software modules that obtain and organize collection information from collection information stores into information-rich collection data structures that are used by application programs.

Collection Physical Representations -- Main Embodiment

Figures 1-3 show the physical form of a simple collection, as would be seen on a personal computer filesystem.

FIG. 1 shows an example prior art filesystem folder from a typical personal computer filesystem. The files and directories shown in this drawing do not implement a collection 100, because no collection specifier 102, FIG. 2 Line 5 exists to associate a collection type definition FIG4 101 101 with collection content information FIG4 103 103.

FIG. 2 shows the prior art folder of FIG. 1, but with a portion of the folder converted into a collection 100 by the addition of a collection specifier file FIG. 2 Line 5 named "cspec". In this example, the collection contents 103 of collection 100 are defined by two implicit policies of a preferred implementation.

First is a policy to specify that the root directory of a collection is a directory that contains a collection specifier file. In this example, the root directory of a collection 100 is a directory named "c-myhomepage" FIG. 2 Line 4, which in turn contains a collection specifier file 102 named "cspec" FIG. 2 Line 5.

Second is a policy to specify that all files and directories in and below the root directory of a collection are part of the collection content. Therefore directory "s" FIG. 2 Line 6, file "homepage.html" FIG. 2 Line 7, and file "myphoto.jpg" FIG. 2 Line 8 are part of collection content 103 for said collection 100.

FIG. 3 shows an example physical representation of a collection specifier file 102, FIG. 2 Line 5, such as would be used on a typical personal computer filesystem.

Collection Information Types

COMPRISE COLLECTION INFORMATION.

Figures 4-5 show three main kinds of information that are managed by collections.

THAT COMPRISE COLLECTION

FIG. 4 shows a high-level logical structure of three types of information managed by

INFORMATION

collections: collection processing information 101, collection specifier information 102, and collection content information 103. A logical collection 100 is comprised of a collection specifier 102 and collection content 103 together. This diagram best illustrates the logical collection information relationships that exist within a preferred filesystem implementation of collections.

FIG. 5 shows a more detailed logical structure of the same three types of information shown in FIG. 4. Collection type definition information FIG. 4 101 has been labeled as per-type information in FIG. 5 103 because there is only one instance of collection type information 101 per collection type. Collection content information FIG. 4 103 has been labeled as per-instance information in FIG. 5 103 because there is only one instance of collection content information per collection instance. Collection specifier information 102 has been partitioned into collection instance processing information 104, collection-type link information 105, and collection content link information 106. FIG. 5 is intended to show several important types of information 104-106 that are contained within collection specifiers 102.

FIG 6 110

Suppose that an application program means 110 knows (a) how to obtain collection processing information 101, (b) how to obtain collection content information 103, and (c) how to relate the two with per-collection-instance information 102. It follows that FIG 6 110 application program means 110 would have sufficient knowledge to use collection processing information 101 to process said collection content 103 in useful ways.

Collection specifiers 102 are useful because they enable all per-instance, non-collection-content information to be stored in one physical location. Collection content 103 is not included in collection specifiers because collection content 103 is often large and dispersed among many files.

All per-collection-instance information, including both collection specifier 102 and collection content 103, can be grouped into a single logical collection 100 for illustrative purposes.

Collection Application Architectures

Figures 6-7 show example collection-enabled application program architectures.

FIG. 6 shows how a collection information manager means 111 acts as an interface between an application program means 110 and collection information means 107 that includes collection information sources 101-103. Collectively, collection information sources 101-103 are called a collection information means 107. A collection information

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CLAIMS

I claim:

1. A process for associating a collection instance with corresponding collection type definition information, to be performed on or with the aid of a programmable device, comprising the following steps:

   (a) obtaining collection specifier information for a collection instance,

   (b) deriving a collection type indicator from said collection specifier information, and

   (c) using said collection type indicator to obtain corresponding collection type definition information for said collection instance,

   thereby associating said collection instance with corresponding collection type definition information, and

   thereby providing a solution to the collection information management problem, and

   thereby enabling software programs to process collection instances more knowledgeably, in the presence of detailed, corresponding collection type definition information.

2. The process of claim 1, further comprising

   (a) using said collection type definition information to obtain corresponding collection content information for said collection instance,

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thereby providing software programs with relevant and detailed collection content information for said collection instance, and

thereby enabling software programs to perform collection processing operations on collection instances that were not previously possible in the absence of collection content information.

3. The process of claim 1, further comprising

(a) writing said collection specifier information into a collection data structure,

(b) writing said collection type definition information into a collection type definition data structure, and

(c) making said collection data structure and said collection type definition data structure available for use by a calling software program,

thereby providing software programs with a practical means for obtaining detailed collection type definition information for collection instances, and

thereby enabling software programs, guided by said collection specifier information and said collection type definition information, to perform collection processing operations that were not previously possible.

4. The process of claim 1, wherein

(a) said step of obtaining collection specifier information uses a collection

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specifier API means and a collection specifier server means,

thereby increasing the network accessibility and scalability of said process for making collection information available to said software program.

5. The process of claim 1, wherein

(a) said step of obtaining collection type definition information uses a collection type definition API means and a collection type definition server means,

thereby increasing the network accessibility and scalability of said process for making collection information available to said software program.

6. The process of claim 2, wherein

(a) said step of obtaining collection content information uses a collection content API means and a collection content server means,

thereby increasing the network accessibility and scalability of said process for making collection information available to said software program.

7. A programmable collection information manager device for associating a collection instance with corresponding collection type definition information, whose actions are directed by software executing a process comprising the following steps:

(a) obtaining collection specifier information for a collection instance,

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(b) deriving a collection type indicator from said collection specifier information, and

(c) using said collection type indicator to obtain corresponding collection type definition information for said collection instance,

thereby associating said collection instance with corresponding collection type definition information, and

thereby providing a solution to the collection information management problem, and

thereby enabling software programs to process collection instances more knowledgeably, in the presence of detailed, corresponding collection type definition information.

8. The programmable device of claim 7, further comprising

(a) using said collection type definition information to obtain corresponding collection content information for said collection instance,

thereby providing software programs with relevant and detailed collection content information for said collection instance, and

thereby enabling software programs to perform collection processing operations on collection instances that were not previously possible in the absence of collection content information.

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9. The programmable device of claim 7, further comprising

(a) writing said collection specifier information into a collection data structure,

(b) writing said collection type definition information into a collection type definition data structure, and

(c) making said collection data structure and said collection type definition data structure available for use by a calling software program,

thereby providing software programs with a practical means for obtaining detailed collection type definition information for collection instances, and

thereby enabling software programs, guided by said collection specifier information and said collection type definition information, to perform collection processing operations that were not previously possible.

10. The programmable device of claim 7, wherein

(a) said step of obtaining collection specifier information uses a collection specifier API means and a collection specifier server means,

thereby increasing the network accessibility and scalability of said process for making collection information available to said software program.

11. The programmable device of claim 7, wherein

(a) said step of obtaining collection type definition information uses a collection

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type definition API means and a collection type definition server means,

thereby increasing the network accessibility and scalability of said process for making collection information available to said software program.

12. The programmable device of claim 8, wherein

(a) said step of obtaining collection content information uses a collection content API means and a collection content server means,

thereby increasing the network accessibility and scalability of said process for making collection information available to said software program.

13. A computer readable memory, encoded with data representing a computer program, that can be used to direct a computer when used by the computer, comprising:

(a) means for obtaining collection specifier information for a collection instance,

(b) means for deriving a collection type indicator from said collection specifier information, and

(c) means for using said collection type indicator to obtain corresponding collection type definition information for said collection instance,

thereby providing means for associating said collection instance with corresponding collection type definition information, and

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thereby providing a solution to the collection information management problem, and

thereby enabling software programs to process collection instances more knowledgeably, in the presence of detailed, corresponding collection type definition information.

14. The computer readable memory of claim 13, further comprising

(a) means for using said collection type definition information to obtain corresponding collection content information for said collection instance,

thereby providing software programs with relevant and detailed collection content information for said collection instance, and

thereby enabling software programs to perform collection processing operations on collection instances that were not previously possible in the absence of collection content information.

15. The computer readable memory of claim 13, further comprising

(a) means for writing said collection specifier information into a collection data structure,

(b) means for writing said collection type definition information into a collection type definition data structure, and

(c) means for making said collection data structure and said collection type

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definition data structure available for use by a calling software program,

thereby providing software programs with a practical means for obtaining detailed collection type definition information for collection instances, and

thereby enabling software programs, guided by said collection specifier information and said collection type definition information, to perform collection processing operations that were not previously possible.

16. The computer readable memory of claim 13, wherein

(a) said means for obtaining collection specifier information uses a collection specifier API means and a collection specifier server means,

thereby providing means for increasing the network accessibility and scalability of said process for making collection information available to said software program.

17. The computer readable memory of claim 13, wherein

(a) said means for obtaining collection type definition information uses a collection type definition API means and a collection type definition server means,

thereby providing means for increasing the network accessibility and scalability of said process for making collection information available to said software program.

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18. The computer readable memory of 14, wherein

(a) said means for obtaining collection content information uses a collection content API means and a collection content server means,

thereby providing means for increasing the network accessibility and scalability of said process for making collection information available to said software program.

19. A computer readable memory containing data with a structure capable of causing a programmable device to operate in a particular manner, the structure comprising:

(a) a compilation of collection type definition information for one or more collection types, organized according to collection type, and containing collection processing information,

(b) means for using a collection type indicator from a request for collection type information initiated by a request originator to obtain corresponding collection type definition information from said compilation, and

(c) means for returning said obtained collection type definition information to said request originator,

thereby providing automated collection processing programs with a practical means for reusing an existing compilation of collection type definition knowledge.

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20. A programmable collection information manager device for making collection type definition information directly available over a network connection, whose actions are directed by software executing a process comprising the following steps:

(a) in response to an incoming network query for collection type definition information containing a collection type indicator, obtaining corresponding collection type definition information using a collection type definition API means connected to at least one collection type definition server means,

(b) writing said obtained collection type definition information into a collection type definition data structure, and

(c) sending said obtained corresponding collection type definition information stored in said collection type definition data structure over the network in response to said incoming query,

thereby implementing a scalable network service for providing shared collection type definition information to automated collection processing programs, and

thereby providing an automated, scalable means for storing and reusing human collection processing knowledge, toward the goal of reducing the knowledge burden required of knowledge workers who currently perform repetitive manual processes on collections of files.

In contrast, the present Collection Information Manager invention has none of these limitations, as the following disclosure will show.

SUMMARY OF THE INVENTION

Collection information managers improve the productivity of knowledge workers in the information industry by organizing information about arbitrary collections of computer files into collection data structures, for use by automated collection processing programs.

Collection information is comprised of three major types of related information: (a) a collection specifier that contains organized information about one collection instance, including a collection type indicator that links to a collection type definition; (b) a collection type definition that defines detailed information about characteristics shared by all collections of a particular collection type, and (c) zero or more collection content files that comprise the information content of a collection.

In operation, collection information managers analyze collections of computer files to produce information-rich collection data structures for use by application programs. Application programs subsequently use the collection data structures to understand and process collections in practical, useful ways.

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DETAILED DESCRIPTION

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Collection specifiers contain information about a collection instance. For example, collection specifiers may define such things as the collection type, a text summary description of the collection, collection content members, derivable output products, collection processing information such as process parallelism limits, special collection processing steps, and program option overrides for programs that manipulate collections. Collection specifiers are typically implemented as simple key-value pairs in text files or database tables.

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Collection Physical Representations -- Main Embodiment

Figures 1-3 show the physical form of a simple collection, as would be seen on a personal computer filesystem.

FIG. 1 shows an example prior art filesystem folder from a typical personal computer filesystem. The files and directories shown in this drawing do not implement a collection 100, because no collection specifier 102, FIG. 2 Line 5 exists to associate a collection type definition FIG 4 101 with collection content information FIG 4 103.

FIG. 2 shows the prior art folder of FIG. 1, but with a portion of the folder converted into a collection 100 by the addition of a collection specifier file FIG. 2 Line 5 named "cspec". In this example, the collection contents 103 of collection 100 are defined by two implicit policies of a preferred implementation.

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FIG. 3 shows an example physical representation of a collection specifier file 102, FIG. 2 Line 5, such as would be used on a typical personal computer filesystem.

Collection Information Types

Figures 4-5 show three main kinds of information that comprise collection information.

FIG. 4 shows a high-level logical structure of three types of information that comprise collection information: collection processing information 101, collection specifier information 102, and collection content information 103. A logical collection 100 is comprised of a collection specifier 102 and collection content 103 together. This diagram best illustrates the logical collection information relationships that exist within a preferred filesystem implementation of collections.

FIG. 5 shows a more detailed logical structure of the same three types of information shown in FIG. 4. Collection type definition information FIG. 4 101 has been labeled as per-type information in FIG. 5 103 because there is only one instance of collection type information 101 per collection type. Collection content information FIG. 4 103 has been labeled as per-instance information in FIG. 5 103 because there is only one instance of collection content information per collection instance. Collection specifier information 102 has been partitioned into collection instance processing information 104, collection-type link information 105, and collection content link information 106. FIG. 5 is intended to show several important types of information 104-106 that are contained within collection specifiers 102.

Suppose that an application program means FIG 6 110 knows (a) how to obtain collection processing information 101, (b) how to obtain collection content information 103, and (c) how to relate the two with per-collection-instance information 102. It follows that application program means FIG 6 110 would have sufficient knowledge to use collection processing information 101 to process said collection content 103 in useful ways.

Collection specifiers 102 are useful because they enable all per-instance, non-collection-content information to be stored in one physical location. Collection content 103 is not included in collection specifiers because collection content 103 is often large and dispersed among many files.

All per-collection-instance information, including both collection specifier 102 and collection content 103, can be grouped into a single logical collection 100 for illustrative purposes.

Collection Application Architectures

Figures 6-7 show example collection-enabled application program architectures.

FIG. 6 shows how a collection information manager means 111 acts as an interface between an application program means 110 and collection information means 107 that includes collection information sources 101-103. Collectively, collection information sources 101-103 are called a collection information means 107. A collection information